

Topics in Primary Care Medicine

Red Eye Unresponsive to Treatment

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Red eyes that fail to respond quickly and completely to topical antibiotic treatment require more extensive evaluation to relieve the symptoms and avert possible sight-threatening complications. The initial differential diagnosis of red eye, which includes iritis, acute glaucoma, keratitis and corneal ulcer, and rarer disorders, must be reexamined. A commonly misdiagnosed cause of red eye is the dry eye syndrome. As a primary or secondary problem, the dry eye syndrome must be treated appropriately to avert sight-threatening complications and to alleviate substantial discomfort. The dry eye syndrome may represent the presenting sign of Sjögren's syndrome or it may be due to medication use, with important systemic and ocular implications.

(Michelson PE. Red eye unresponsive to treatment. *West J Med* 1997 Feb; 166:145-147)

PPrimary care physicians commonly and appropriately treat red eyes. Frequently, however, red eyes fail to respond to simple treatment with topical medication, and patients return with persistent or worsening symptoms. Of course, patients can always be referred to an ophthalmologist. Often, however, a primary care physician can formulate an accurate diagnosis and therapy regimen now that a "therapeutic trial" has failed or the cause has declared itself.

Most patients unresponsive to initial therapy for red eyes have been treated with topical antibiotics. Most ophthalmologists agree that topical steroid treatment should not be used until a definitive diagnosis is made and the patient can be followed up with appropriate instruments and knowledge. The possibility of potentiating and aggravating a herpes keratitis or other infections, the longer term consequences of topical steroid therapy such as glaucoma and cataract, and the necessity of careful follow-up for those conditions in which steroids are truly indicated dictate against their casual use.

Allergy to and Toxicity of Topical Agents

A frequent cause of the persistence of red eyes is an allergy to the drops prescribed. If purulent discharge has eased, but the eyes remain red and itchy, all medications can be discontinued to see whether the symptoms resolve. The same approach applies for those patients who are having a toxic reaction to topical agents. Many patients have a nonallergic reaction to certain topical antibiotics, preservatives, or both. Simply stopping the medications should result in a prompt resolution.

Differential Diagnosis of Red Eye

If the patient has already stopped the medications, or the symptoms have either persisted or worsened, further

differential diagnosis is necessary. If the patient continues to have a purulent or possibly purulent discharge, a culture and sensitivity testing are indicated. Question the patient about persisting discharge and crusting on the lashes on awakening. In general, external ocular infections respond rapidly to the wide variety of topical antibiotic preparations available, and initial culture and sensitivity testing for purulent conjunctivitis are unnecessary.

If simple purulent conjunctivitis is ruled out or questionable, the basic differential diagnosis of red eye should be reexamined.¹ More serious disorders may not declare themselves with the full constellation of symptoms described in the textbooks.

Iritis

Iritis typically presents with pronounced photophobia, deep red injection, a sluggishly reactive pupil, possibly blurred vision, floaters, and often some associated pain. Thick discharge is not associated with iritis, although the eye may tear profusely. At slit-lamp examination, the diagnostic signs of intraocular inflammation are seen as cells and flare in a normally clear anterior chamber. Numerous systemic conditions, such as sarcoidosis and ankylosing spondylitis, are associated with iritis (also called "anterior uveitis" and "iridocyclitis"), although most cases of iritis are idiopathic.²

Angle-Closure Glaucoma

Angle-closure glaucoma typically presents with severe ocular or supraorbital pain, deep injection of the eye, a loss of normal corneal clarity and luster, a moderately fixed or sluggish mid-dilated pupil, and an elevated intraocular pressure. Discharge is not a characteristic of this disorder, although the eye may tear. The patient's vision is blurred, and characteristically there are halos

noted about lights. The full constellation of symptoms is not always present, however.

Keratitis and Corneal Ulcer

Photophobia, some pain, pronounced watering of the eyes, and reddened and irritated eyes are characteristic of keratitis, an inflammation of the cornea due to various infectious and toxic agents. Herpes simplex keratitis is typically painful, with photophobia and watering, and usually associated with blurred vision if the lesion is central. If the patient suffers from recurrent herpes keratitis, there is generally a history of previous episodes. In a case of primary ocular infection, herpetic vesicles may be found elsewhere. In either case, primary or recurrent, a history of typical precipitating factors, such as fever or sun exposure, may be present.

Slit-lamp magnification and fluorescein staining define the corneal changes of keratitis and suggest the cause. Adenoviruses, herpes zoster, dry eyes, neurotrophic effects from fifth cranial nerve disorders, abnormal exposure of the eye, and various granulomatous and other infections represent some of the causes of keratitis.

When an inflammatory white infiltrate develops in the cornea underlying an erosion or loss of epithelium, an infectious ulcer must be diagnosed and urgent ophthalmologic consultation obtained. Some highly pathogenic organisms, such as *Pseudomonas aeruginosa*, can progress to perforation and endophthalmitis within 24 hours. Central ulcers, even if successfully treated, may result in permanent scarring and loss of vision. Usually corneal ulcers present with pain and a red eye. Discharge may be minimal or nonexistent, and vision may not be affected if the ulcer does not yet involve the visual axis. The infiltrate may be small, subtle, and hard to detect without slit-lamp magnification. Thus, pain associated with a red eye should alert a physician to the need for urgent ophthalmologic evaluation, even in the absence of visible corneal disease.³

Noninfectious Conjunctivitis

Allergic conjunctivitis is typically caused by airborne pollens and other allergens. The hallmark and most prominent symptom is itching, usually associated with a watery discharge. Itching is not pathognomonic and can occur in other external ocular disorders, such as blepharitis and dry eye syndrome, although in disorders other than allergy, itching is not typically the chief symptom.⁴

A variant of allergic conjunctivitis is the immune response to soft contact lens wear called "giant papillary conjunctivitis." In this disorder, the type of contact lens may need to be changed or the use of contact lenses discontinued altogether. For the general relief of allergic conjunctivitis, therapy can be escalated from simple applications of cold compresses or cold artificial tear drops to topical antihistamine therapy, nonsteroidal anti-inflammatory drops, and mast cell stabilizers. Topical steroid use is reserved for only the most severe cases. We try to avoid the prolonged use of any vasoconstrictor drops because "rebound" vasodilation can occur.

Physicians should always consider, because of its profound consequences, the Stevens-Johnson syndrome, a combination of conjunctivitis, other mucous membrane inflammation, and erythema multiforme. If a patient is taking a parenteral medication that may have precipitated this response, it must be recognized as soon as possible and appropriate action taken. The Stevens-Johnson syndrome, along with other cicatricial external ocular inflammatory disorders, such as benign mucous membrane pemphigoid, can result in such severe drying, exposure, and deformity of the outer eye that vision is seriously threatened.⁵

Keratoconjunctivitis Sicca

Far more common than generally appreciated is the dry eye syndrome. Usually occurring as an isolated phenomenon in women after menopause, this syndrome nonetheless can be seen in a spectrum ranging from otherwise healthy young men to patients with obvious Sjögren's syndrome.⁶ When a red eye fails to respond to medication or recurs frequently, the dry eye syndrome is always a consideration. The hallmark symptom of dry eye is an ongoing foreign body sensation or a gritty or sandy feeling in the eye. Often the eyes simply look dry, lacking the normal corneal and conjunctival luster. In other cases, patients complain paradoxically of excessive tearing. There is a constant basal tear secretion for lubrication and a secondary reflex tear production responsive to irritants and emotions. With low-grade to moderate tear deficiency, the irritated dry surface stimulates excessive reflex tearing. It is only in the more severe forms of the dry eye syndrome that reflex tearing is absent as well, and patients will actually have an inability to tear.

Dry eyes often have an associated blepharitis with red, irritated-looking eyelids and *Staphylococcus aureus* superinfection. Physicians should always question patients with dry eyes about a possible dry mouth and the symptoms of collagen vascular disorders such as rheumatoid arthritis, which all together make up the triad that is diagnostic of Sjögren's syndrome.

The most common and well-known test for the dry eye syndrome is the Schirmer test. In this test, small strips of filter paper are laid over the eyelid margin, and the amount of tear wetting that occurs over a five-minute period is measured. A positive test, less than 5 mm of wetting in five minutes, indicates a dry eye syndrome. A negative test, on the other hand, does not necessarily indicate the absence of a dry eye. Generally a diagnosis of keratoconjunctivitis sicca is made by positive findings on the history, examination, and confirmatory testing.

The use of fluorescein dye is well known to most primary care physicians because it is typically used to diagnose corneal abrasions. It will stain the cornea in the absence of normal epithelium. Thus, corneal ulcers or other disorders that result in a denuding of the epithelial layer will stain positive with fluorescein stain. Rose bengal solution stains devitalized epithelial cells. It is also not specific to the dry eye syndrome, but it is one of the more

sensitive diagnostic tests for this disorder, as well as any disorder that causes abnormality of the epithelial layer. Typically, the exposed inferior cornea and interpalpebral conjunctiva will show a punctate staining pattern with both dyes in patients with keratoconjunctivitis sicca.

The treatment of primary dry eye syndrome consists of artificial tear drops, night-time lubrication if necessary, and educating the patient about appropriate precautions and treatment. A variety of artificial tears products are available over the counter, varying mainly in their viscosity and preservatives. The thicker the artificial tear drop, the longer it will last, but the more likely it is to cause transient blurring and a possible residue on the lashes. Patients who have severe dry eyes and require applications of eye drops as often as every two hours or more should use nonpreserved artificial tear drops that come in small unit-dose vials. Virtually all preservatives have epithelial toxicity if used often enough. Patients can choose the best combination of frequency of instillation and tolerance of viscosity.

The use of night-time lubrication in the form of nonpreserved, nonmedicated ointments is extremely effective. Clinical experience suggests that in addition to improved night-time and early morning comfort, the nightly application of the ointment can reduce the frequency of artificial tear application during the day.

When these measures are insufficient, punctal occlusion can be done. By blocking the lacrimal drainage puncta, the tears that are produced and the drops that are applied remain in the eye longer. This measure can produce rather dramatic improvement for patients in whom the frequent instillation of drops and ointments is either insufficient or oppressive.

Sometimes patients are uncertain whether their dry eye problem is worsening or they are developing an intolerance or allergy to eye drops. In such cases, simply increasing the frequency of the eye drops should provide an answer. Obviously, a more frequent use of eye drops in a patient with an allergic or toxic reaction increases the symptoms, whereas increasing the frequency of the use of drops in a patient with worsening dryness will provide greater relief.

Patients must also be instructed in the environmental and personal physical conditions that can mitigate or

exacerbate the dry eye syndrome. Any fatigue or concurrent illness generally exacerbates the syndrome, as do a host of parenteral anticholinergic medications, antihistamines, or β -blockers. Environmental factors resulting in low humidity, such as high altitudes, cold climates, or long airplane rides in which the humidity is extraordinarily low, will cause substantial exacerbations. Patients should be advised to anticipate these problems and to compensate with increasing frequency of artificial tear applications or even the use of ointments during such an interval.

In summary, the dry eye syndrome is a commonly encountered cause of recurrent and unresponsive red eye. Patients must be treated and advised about the nature of dry eyes to avoid irritation, sight-threatening epithelial changes, and secondary infection.

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